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THE NESTING GROUNDS AND NESTING HABITS OF THE SPOON-BILLED SANDPIPER.¹

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Plate V.

THE Spoon-billed Sandpiper (*Eurynorhynchus pygmaeus*) is essentially an Asiatic species. There are but three specimens claimed to have been taken in North America, as far as known to the author, with some doubt attached to the locality of capture of one of these, which fact probably indicates that the occurrence of the bird in North America is irregular or casual. If the species nests on the Arctic shores of Alaska, or even habitually visits the region, it is reasonable to believe that the presence of so peculiar a bird would have been detected by more of the naturalists that have collected along the Alaska coast between Bering Strait and Point Barrow.

The Spoon-billed Sandpiper appears to be unknown to the American Eskimo, for the author was unable to find one among those interviewed who recognized it when skins were exhibited. On the other hand the "Chuckchies" of northeastern Siberia are familiar with the species, calling the bird by name when shown specimens.

The species is included in the A. O. U. 'Check-List' as a North

¹ Contribution from the Museum of Vertebrate Zoölogy of the University of California.

American bird on the basis of a "summer" specimen taken by Captain Moore of the British Ship Plover, on Choris Peninsula, Kotzebue Sound, Arctic Alaska, during the summer of 1849 (Coues, 1884, p. 78, footnote). This was the first and, for many years, the only known example of the species in summer plumage, and from 1849 until 1915 it was the only recorded specimen from North America. Hence the position of this individual specimen has been unique, and we are able to check up discrepancies in different published accounts with the reasonable assurance that the varying statements encountered all refer to the same bird. The first record that the author has been able to find of this particular specimen is in the 'Proceedings' of the Zoological Society of London for 1859 (p. 201) where it is mentioned as having been exhibited by Mr. Sclater at a meeting of the Society. At that time, ten years after its capture, the bird was supposed to have come from the "Northeastern Coast of Asia." In 1903 this same specimen seems to have afforded the only basis for Coues' statement (p. 813) concerning the species: "breeding" "on the Arctic coast of Alaska." The history of this specimen in literature is shown on the following diagram (Fig. 1), illustrating the relation of all subsequent published statements to the original record in 1859, and also how the supposed locality of capture has shifted from Asia to North America.

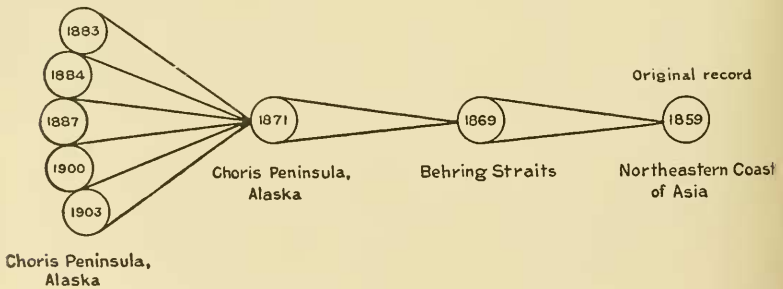


Fig. 1. Diagram of records relative to the first known "summer" specimen of Spoon-billed Sandpiper showing: (1) relation of records; (2) gradual shifting of the records of the locality of this specimen from Asia to North America.

1903. Coues, p. 813. "Breeding on the eastern Arctic coast of Siberia, and also on the Arctic coast of Alaska."

1900. Grinnell, p. 74. "This specimen was in summer plumage and was taken on the Choris Peninsula by Captain Moore of H. M. S. Plover in 1849."
1887. Nelson, p. 112. "The presence of this remarkable little Sandpiper in the list of birds of Alaska is due to the capture of a specimen at Choris Peninsula, during the summer of 1849, by the captain of the British ship Plover — Proceedings of the Zoological Society (1871, p. 110)."
1884. Coues, p. 78. "It is recorded by Harting, P. Z. S., 1871, pp. 111, 114, from Choris Peninsula, the specimen said to have been procured there in 1849, and figured in the Ibis, 1869, p. 426, Pl. XII."
1883. Nelson, p. 87. "The record of this specimen is in the proceedings of the London Zoological Society for 1871, p. 110."
1871. Harting, p. 111. "It was obtained by Capt. Moore on the Choris Peninsula. . . . This specimen was described and figured in 'The Ibis' for 1869, p. 426, Pl. XII."
1869. Harting, p. 433. "24. One in summer plumage from Behring's Straits, by expedition under Capt. Moore in H. M. S. 'Plover' (Proc. Zool. Soc. 1859, p. 201). Now in new Museum at Oxford."
1859. Secretary Zool. Soc. London, p. 201. "Mr. Sclater exhibited specimens of two rare species of Arctic birds from the collection of John Barrow, Esq. . . . One of these was the new species of Diver with a white bill, described by Mr. G. R. Gray as *Colymbus adamsi*. . . . The other was an example of the exceedingly scarce Wader with a spatulated bill *Eurynorhynchus pygmaeus*. . . . in what was apparently its summer dress, the head, neck and breast being rufous. . . . The locality of this specimen was supposed to be the North-eastern Coast of Asia."

The following data regarding the itinerary of the *Plover* on this particular voyage have been obtained chiefly from 'The Tents of the Tuski' by Lieut. W. H. Hooper, an officer under Capt. Moore during this voyage of the *Plover*. Seeman's narrative of the voyage of H. M. S. *Herald*, 1845-51, also throws considerable light on this voyage of the *Plover*, as both ships were sent on the same mission. The *Plover* and *Herald* were two of several ships sent out between 1848 and 1852 from England to search for Sir John Franklin. The *Plover* sailed from England in January, 1848, on this voyage (Seemann, 1853, p. 191) but being a slow sailer did not reach her destination, Kotzebue Sound, that year. The *Plover* went into winter quarters in what is now known as Plover Bay, a small bay within Providence Bay, northeastern Siberia

(Hooper, 1853, p. 12). The vessel remained frozen in the ice at this point from October, 1848, until the last of June, 1849. Hooper (1853, pp. 206-207) states "we sailed from Emma's Harbor at the end of June, and proceeded up Behring's Straits, anchoring several times near the Asiatic shore, on which occasions parties of our friends visited the ship. The last point of contact was the Bay of St. Laurence." From this point "we steered for Kötzebue Sound and anchored near Chamisso Island on the 14th of July." Here Lieutenant Hooper started ashore but was called back by the arrival of the *Herald*, and "both ships' crews were therefore immediately set to work to transfer stores and provisions. On the 18th the 'Herald' and 'Plover' weighed at an early hour." Seemann (1853, p. 193) states that the *Plover* was "off Wainwright Inlet on the 25th of July, 1849." She returned from her Arctic cruise and again met the *Herald* at Kotzebue Sound on September 2, 1849. From Simmonds (1852, p. 308) we learn that "the Plover was safely ensconced for the winter of 1849-50 in Kotzebue Sound."

In looking over the ten species of birds, specimens of which are indicated by Harting as having been obtained on the Choris Peninsula in 1849 by Captain Moore of the *Plover* (Harting, 1871, p. 114; Grinnell, 1900, p. 66), we find that the list contains no species peculiar to North America. However, we do find that at least two of the species (Spoon-billed Sandpiper and Mongolian Plover) are essentially Asiatic. To the author's knowledge only two other American specimens of the Spoon-billed Sandpiper and no other specimen of the Mongolian Plover have been claimed to have been taken in Alaska since 1849.

The *Plover* and her crew wintered in 1848-49 and spent the main portion of the breeding season of 1849 along the coast of north-eastern Siberia, the region which has recently been proved to be the main breeding ground of the Spoon-billed Sandpiper (Brooks, 1915, p. 382). On the other hand, only four days (July 14-18, 1849) were spent at Choris Peninsula, Kotzebue Sound, most of this time being devoted to transferring stores aboard the ships (Hooper, 1853, p. 213).¹ Under the circumstances it would seem

¹ Mr. W. L. Sclater, Editor of 'The Ibis,' was written to in regard to the present condition of Captain Moore's specimen of *Eurynorhynchus pygmaeus*. At his kind solicitation, both

that the first record (1859) was correct and that Captain Moore's specimen really did come, as first recorded, "from the North-eastern Coast of Asia." The present author believes this to have been the case.

Two other questionable American records of the Spoon-billed Sandpiper have been reported. Ridgway (1881, p. 85) states: "Spoon-billed Sandpiper — Point Barrow, Arctic Coast of Alaska, *vide* Dr. T. H. Bean." Bean (1882, p. 165), however, records a single specimen, secured by a native boy at Plover Bay, Siberia, "most probably late in August, 1880." Seebohm (1888, p. 441) states: "Nelson obtained a specimen in Alaska." This appears to have been an error, since Nelson (1887, p. 112) states that he secured a single specimen at Plover Bay, on the Siberian shore in 1881 and then adds "but not another individual of this rare bird was seen."

The only well established occurrence of the Spoon-billed Sandpiper in America is that vouched for by Fred Granville of Los Angeles, California, who on August 15, 1914, took two specimens at Wainwright Inlet, on the Arctic Coast of Alaska (referred to heretofore only casually, by Swarth, 1915, p. 136). One of these specimens, a female, is now number 3552 in the collection of A. B. Howell, of Covina, California, while the other, a male, is number 1698 in the collection of G. Willett of Los Angeles. Through the courtesy of these gentlemen, the writer has been enabled to examine the Granville specimens and to compare them with a male bird taken at Cape Serdze, Siberia (no. 16699, Mus. Vert. Zool.), and another male taken by Granville, July 12, 1914, at Russian Spit, Siberia (no. 3551, Howell coll.). Both of the Wainwright specimens, although taken the middle of August, are still in the summer plumage, with the chestnut edgings of the feathers on the upper parts, and the chestnut wash on the head and throat almost as

the bird and the museum records concerning it have been examined by Mr. Henry Balfour, curator of the Pitt Rivers Anthropological Museum at Oxford, England. The specimen is still (February, 1918) mounted and in a good state of preservation at the Oxford Museum, having been kept under a small bell-glass and away from strong light. No additional information regarding the locality of capture of this specimen was, however, forthcoming. The entry in the Catalogue of the Comparative Anatomy Department of the University Museum at Oxford is as follows: "In summer plumage, obtained in Behring Strait by Capt. Moore, 1849"; while according to the label on the stand on which the specimen is mounted, "This specimen was taken in Behring Straits."

bright as in breeding birds. The writer has been unable to discover any indication of the fall molt in these two specimens.

Mr. Granville has given me a full account of the circumstances under which he took these two Spoonbills at Wainwright Inlet. The following extracts, slightly modified in wording, are from his letter of January 9, 1918. "On August 15, 1914, I and my assistant hiked back of Wainwright to what I judged to be a distance of about ten miles, traveling in a northerly direction. . . . The tundra where I found the Spoonbills was interlaced as far as the eye could see with little lagoons and long channels of water, and in this territory I collected the two Spoon-bills. . . . These birds were shot out of a flock of possibly ten. I followed them for about an hour before I could get a shot at them. The birds would run along the tundra en masse and were undoubtedly gleaning food from the moss. The minute they would catch sight of me they would fly out of shot-gun range. There were about six birds that looked to me through field glasses to be in markedly different plumage from the birds I shot. These six birds, immature as I supposed, seemed to be of a solid color and that a dark gray. On the first shot fired, with which I got two, the birds flew across a lake and I lost track of them, though I spent four or five hours looking for some more. . . . I believe that these birds breed in the neighborhood of Wainwright and hope that at some close future date someone will bear out my statement "

It is a common occurrence for whaling and exploring vessels to visit both the Siberian and American shores during a summer cruise in the Arctic, hence reliability of the collector is the only guarantee as to places of capture of specimens gathered on such a cruise. Since the species under discussion is rare on the American shore and occurs in relatively much greater abundance on its breeding ground on the Siberian side, it is one regarding which mistakes might easily occur. Mr. Granville, while not a well-known collector, has been a member of the Cooper Club for several years, and is a man whose observations we can accept without question.

The writer spent several days at Wainwright Inlet two weeks after Mr. Granville's departure and although the various flocks of sandpipers present, then mostly in winter plumage, were examined

with binoculars, no Spoon-bills could be found. The fall migration was much in evidence at this time. Whether Granville's birds were some that had bred at Wainwright, as he supposed, or were merely stragglers from Siberia after the breeding season, is uncertain. The true status of the species at this point can only be settled by further field work at Wainwright Inlet during the breeding season.



Fig. 2. Map showing summer record stations of Spoon-billed Sandpiper.

From our present data, the range of the Spoon-billed Sandpiper may be defined as follows: The breeding habitat lies along the Arctic coast of northeast Siberia, possibly also at favorable localities on the Alaskan coast (see Fig. 2), spring and fall migration route along the Asiatic shores of Bering Sea and the Pacific Ocean, and winter home in southern India. The following record of specimens from the 'Catalogue of Birds in the British Museum' (Sharpe, 1896, p. 537) affords an outline of the migration route of this bird. An adult male, still in summer plumage, was taken August 8, at the mouth of the Amur River in southwestern Russia. An immature

was secured on October 8 at Hokodadi [Hakodate], Japan, while an adult female was collected at Ragoon, India, on December 1. The spring migration is represented by an adult male in summer plumage taken in April at Shanghai, China.

Although this bird has been known for many years, at least as far back as the time of Linnæus in 1764 (Harting, 1869, p. 428), it was only the winter plumage with which ornithologists were familiar. The summer dress was unknown until 1849, when Captain Moore of the *Plover* took his single specimen. The breeding ground of this species was not definitely known until Johan Koren found young Spoon-billed Sandpipers able to run on July 24, 1909, on the mainland near Koliuchin Island, northeast Siberia. Koren also took a half-fledged young on July 28 or 29, 1909, at Cape Wankarem about seventy miles west of Koliuchin Island (Koren, 1910, pp. 14-15). To John E. Thayer, we are indebted for the first published description of the nest and eggs of this rare wader, based upon a nest with four eggs and the male parent, together with eight downy young, secured by Captain F. E. Kleinschmidt at Cape Serdze, northeast Siberia, July 15, 1910. This article, published in 'The Auk' for April, 1911, was illustrated by colored plates of the eggs and the head and bill of the downy young and adult stages.

Nordenskiöld (1881, p. 43) reports that birds of this species appeared in numbers in June near the winter quarters of the *Vega*. This locality was near the east shore of Koliuchin Bay. Nordenskiöld, however, discovered no evidence of the species breeding at this point and it was nearly thirty years later that Koren found young Spoon-billed Sandpipers in this region.

The present author met his first living Spoon-billed Sandpiper at Providence Bay, Siberia (see Plate V, Fig. 1) the middle of June, 1913, when upon an ornithological cruise in the Arctic in the interests of John E. Thayer, who has kindly permitted the use of such notes and material as were needed in the preparation of this article.

In color, size and actions the Spoon-billed Sandpiper closely resembles the Eastern Least Stint (*Pisobia minuta ruficollis*), the marked similarity between them resulting in both the author and his fellow collector W. S. Brooks, failing to distinguish between the

two species until June 20, after we had been among them for some days. However, despite our initial failure to secure the birds, it is my belief that the Spoon-bill begins to arrive on its breeding grounds by the end of the first week in June. A pair of sandpipers was encountered near the east shore of Emma Harbor, in Providence Bay, on June 6, 1913, which evidently belonged to this species. The male was at this time energetically engaged in his characteristic nuptial song flight while the female fed quietly among the tussocks near the edge of a pond on the tundra.

Although the spatulate tip of this bird's bill is very noticeable when viewed from directly above or below, it is not a character which can be advantageously used to identify the species in the field, for the simple reason that in nearly all close views of the living bird only lateral or frontal aspects of the bill are obtained. Viewed from the side, as shown in Thayer's illustration (*loc. cit.*, Plate II, Fig. 5), the bill is not sufficiently peculiar in outline to be distinguished from those of other small sandpipers at any great distance. Even when a bird was feeding, and the bill was observed under the most favorable conditions, the peculiar shape was not nearly as conspicuous as one would expect. In the author's experience, the most reliable method of identifying the bird in the field was by noting the glint of light that was reflected from the broad tip of the upper mandible when the sunlight struck the bill at a certain angle. Even in flight, the bird could often be identified by this faint beam of reflected light. Our first specimen was collected on June 20, suspicion having been directed to this particular bird by seeing the sunlight reflected from the tip of the bill, as above described.

We found that the Sandpiper had a decided preference for the grassy margins of fresh-water ponds, while single birds were frequently found feeding along the algæ-bordered rims of tundra pools. Sandy lagoons where rivers entered the bay were favored by them as well.

The song and nuptial flight of the male Spoon-bill, attractive as they were to the collector, in sight of such rare birds at last, were as elusive as a will-o'-the-wisp. In fact we were never able to locate a female Spoon-bill on the nest and I have always believed that our lack of success in this regard was due to the warning given

by the male. Upon approaching the nest site, while we were yet afar off, we were greeted by the male in full song. This song, ventriloquial, pulsating, and cicada-like in quality, seemed to come first from one and then from another point in the heaven above. Sometimes we searched the sky altogether in vain, but usually the bird was discovered in rapid flight at an altitude of two or three hundred feet above the earth.

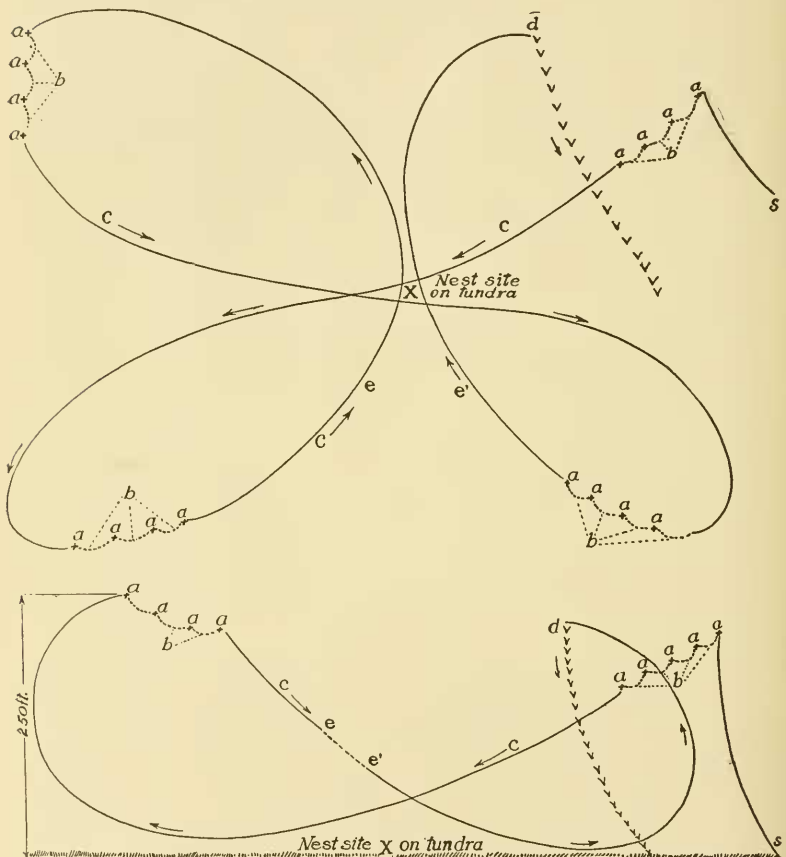


Fig. 3. Diagrams of the nuptial flight of the Spoon-billed Sandpiper. Upper figure represents the flight as viewed from above. Lower figure depicts one half of the same evolution as seen from one side. (s) start, (a) Poise or hover accompanied by song, (b) short dip (no song), (c) rapid sweep down over nest site, ending in new position, (d) gentle glide to earth, (X) nest site on tundra. Flight e to e' in upper figure is represented by the broken line e to e' in the lower figure.

The nuptial flight consists of momentary poises alternating with rapid dips (Fig. 3). When the bird hovers or poises, the rapid beating of the wings is accompanied by a fine, rhythmical, pulsating, buzzing trill: *zeé-e-e*, *zeé-e-e*, *zeé-e-e*, rapidly repeated (Fig. 3a). Following this the bird approaches the intruder, swinging down in a sharp curve until ten feet lower than the previous hovering point (Fig. 3b) where he again poises on rapidly beating wings, pouring forth anew his insistent, musical trill. After repeating this performance four or five times, the songster sweeps down in a long graceful curve (Fig. 3c) until he almost touches the earth near his brooding mate, then curving off, he turns and rises rapidly and almost perpendicularly until almost out of sight. From this new point of vantage the whole performance is repeated. After four or five such excursions, in each of which the intruder is approached from a different direction, the guardian of the nest descends by raising his wings nearly vertically until they form in anterior outline the letter V. The bird thus gliding on motionless wings drops lightly but quickly to earth, uttering the *zeé-e-e* in a richer yet more subdued tone (Fig. 3d). As soon as he touches the earth the song ceases and the silent bird trots quietly off over the moss, where his trim form blends with the lichen and mossy tussocks so that, upon remaining motionless he disappears with amazing rapidity. Time and again we thus lost sight of the birds, which we later discovered by the aid of binoculars, to be standing or squatting motionless within fifty feet of us. Although this "fading out" method of exit is commonly employed by many shore birds, in the case of the Spoon-billed Sandpiper it seems to have been developed to an extreme degree.

The two nests of this bird that came under the author's observation were discovered through flushing the brooding male. The birds were very shy and as there was no cover other than a thin growth of grass about six inches high, approach by stealth was difficult (see Plate V, Fig. 2). The birds usually sneaked off while the observer was forty or fifty yards distant, and in order to find the nest it was necessary to hide, as best one could, near the place where the sandpiper had flushed, until it returned again to the nest. In one instance a depression partly filled with water was the only available hiding place. Fortunately for the watcher the water

was not cold and the male bird returned in twelve minutes to the nest, which contained two *fresh* eggs (Plate V, Fig. 2).

The most striking fact in the domestic life of the Spoon-billed Sandpiper is that the major portion of the household duties, aside from the actual laying of the eggs, is performed by the male and not the female bird. In addition to our own observations Kleinschmidt also has found this to be the case. He states: "Although our observations were limited to but a few, still I believe the male solely attends to the hatching and rearing of the young" (Thayer, 1911, p. 154). In the author's experience, none of the several females taken were found on or within fifty feet of the nest. It is possible, however, that they may have been warned by the male birds and had sneaked off before we were close enough to detect their leaving.

In the unequal division of domestic duties conditions among the Spoon-bills are similar to those among the Phalaropes where the male, after he has been courted and won by the larger and more brilliant female, takes upon himself almost all of the household cares. However, in the case of the Spoon-billed Sandpiper there is nothing to show that the female does the courting although she is the larger of the two. Mr. Thayer in commenting on the relative size of the sexes states: "In looking over my series of fourteen skins, all adults, I find that the females are larger and their mandibles noticeably so" (Thayer, 1911, p. 154). The female Spoon-bill is thus seemingly content to merely lay the eggs, while she lets the male build the nest, incubate the eggs, and take care of the young. In corroboration of the latter statements the author observed a male bird building a nest at Providence Bay, Siberia, June 22, 1913, another male was flushed repeatedly from a nest containing two fresh eggs near the same place on the same day, while a third male was found tending three downy young at Cape Serdze, Siberia, on July 17, 1913.

The nest of this Sandpiper was found to be merely a cavity scratched out among the dead grass blades. It was a shallow affair placed where the grass grew thickest (Plate V, Fig. 2). On June 22, 1913, at Providence Bay, the writer witnessed the construction of a nest from a distance of about forty feet. The bird, a male, scratched and then picked at the dead and matted grass

blades and moss until he had dug out quite a hole. Then he squatted down in the depression and twisted about, pressing against the moss that formed the sides of the nest, until a cavity about three and one-half inches in diameter and an inch deep was formed. Dead leaves from a creeping Arctic willow that grew in the moss nearby, were used to line the nest.

We have the following data regarding the dates at which the eggs are laid and the number of eggs in a set. A clue is also afforded as to the time required for the eggs to hatch.

<i>Locality</i>	<i>Date</i>	<i>Nesting evidence</i>	<i>Collector</i>
Providence Bay, Siberia	June 22, 1913	2 fresh eggs in nest	J. Dixon
Providence Bay, Siberia	June 22, 1913	Nest in course of construction	J. Dixon
Cape Serdze, Siberia	July 15, 1910	4 eggs "just ready to hatch"	F. E. Kleinschmidt
Cape Serdze, Siberia	July 17, 1913	3 young just out of nest	J. Dixon

From the above data it seems probable that the set is of three or four eggs; June 20 to 25 may be taken as the time when laying begins. The eggs of the Spoon-bill found by the author at Providence Bay were not markedly different in markings, shape or color from those of other small sandpipers, such as the Eastern Least Stint. In the field, the eggs of the Spoon-billed Sandpiper appeared to be slightly larger than those of the Stint. The measurements of the four eggs collected by Kleinschmidt are given by Thayer (1911, p. 154) as follows: "1.20 × .92; 1.22 × .90; 1.20 × .88; 1.30 × .90 inches." For positive identification, we found it advisable to secure the parent bird with the eggs, and in order that there might be no mistake, the incubating male was secured just as he jumped from the nest.

Regarding the time required for incubation, we have only circumstantial evidence to offer (see preceding table), but our observations lead us to believe that about eighteen or twenty days elapse between the time the last egg is laid and the first young hatched.

On July 17, 1913, at Cape Serdze, Siberia, while strolling along the spongy green turf beside a fresh-water pond, my attention was attracted by the "broken wing" antics of a Spoon-billed Sandpiper. Although my eyes remained "glued" on the spot from which the bird arose, no nest or sign of young could be found when

I reached the place. Soon a second bird, presumably the female, arrived on the scene. Both appeared much concerned and from their actions I felt sure that there were young near by. A careful search of the short grass, which was not over two inches high, failed to reveal any living creature. I therefore retired to a grassy mound about twenty yards away and awaited developments. Both parent birds, giving their alarm notes, circled about overhead, where they were soon joined by a pair each of Eastern Least and Temminck's Stints. The two pairs of stints were later found to have broods of downy young in the grass on the opposite shore of the lagoon near by. Soon both Spoon-bills flew off across the lagoon and disappeared, but the male returned promptly, alighting quietly near the margin of the pond. Here he stood motionless for nearly a minute, and then trotted through the grass directly to the spot from which I had first flushed him. At this point he stood still for another full minute, during which time he looked all around, seemingly to make sure that the coast was clear. Having satisfied himself that no active enemy was in sight he stepped forward and bending over uttered a soft call in a low tone "*plee-plee-plee.*" This call was repeated a second time, and instantly there arose directly in front of him a tiny mouse-like brown form, seemingly rising from out of the very ground. With tottering unsteady steps the downy young sandpiper stumbled and fell toward the parent, who continued calling and encouraging it.

Upon my sudden appearance, the old bird gave a quick warning note and at this signal the youngster squatted motionless with neck stretched forward on the ground. Although I knew the exact spot where it disappeared, it was some time before I was able to locate the tiny form, so well did it blend with the clump of reddish moss upon which it had squatted. A careful search revealed no other young sandpipers so I returned to my hiding place. This time I had to wait longer for the male to return and, while I was waiting, a second sandpiper which I believed to be the female arrived but did not go near or call the young.

Two or three minutes elapsed this time between the return of the male and the giving of the low call notes, when as before another downy young quickly arose at the signal and toddled over to its parent. After this second experience I was forced to change

my hiding place, as the male Sandpiper refused to return to the young until I moved. He seemed much concerned upon this last visit, probably realizing that it was high time the young should be hovered and warmed.

I could not understand why all the young had not risen at once in answer to the parent's call but I noticed that he had in each case gone up to within less than two feet of the one in hiding, and then with lowered head facing the chick, gave the call note. In each case it was the youngster thus directly addressed that responded to the signal and arose. The note of the young was a low rusty squeak, scarcely audible to human ears. It was very similar to the note of the young Semipalmated Sandpiper (see Dixon, 1917, p. 190).

As far as my observations went, there was no attempt on the part of the parent to feed the young, and it is my belief that from the time they are hatched the young Spoon-bills hunt their own food. The exercise thus gained was found in the case of young Semipalmated Sandpipers to be essential to the health of the chicks. In addition to keeping warm by running about the young Spoon-bills are hovered and warmed at regular intervals by the parent. The brood mentioned above had survived a fairly severe snowstorm on the preceding day.

An effort was made to carry the three downy Spoon-bills back to the ship alive, and as we had "hopped, skipped and jumped" ashore over a mile of drifting ice cakes, the packing was done with care. A thick nest of cotton was made in the collecting basket, but within an hour the young sandpipers began to go into convulsions and although they were placed inside of the author's "parka" next to his body, they all soon died. Their death seemed to be due to lack of exercise, as they were kept warm, and certainly could not have starved to death in an hour. Manniche (1910, p. 146) reports a similar experience with two downy young of the Sanderling, on the breeding grounds of this species in north-east Greenland.

As has been pointed out by Thayer (1911, p. 154), the bill of the newly hatched young of this Sandpiper shows the characteristic "spoon" well developed. The narrow part of the bill of a downy young Spoon-bill is short compared with that of the adult, while

the spatulate tip is more oval, as compared with the angular outline of the bill of the adult bird. In outline the bill of the young closely resembles the conventional "spade" on playing cards.

Our observations disclosed no peculiar advantage attending the singular shape of this sandpiper's bill, though careful watch was kept to see just how this member was used. On July 17, 1913, a pair of Spoon-billed Sandpipers was watched for half an hour as the two birds fed within fifty feet of the observer, concealed behind a sandy dune. Their favorite feeding ground was a fresh-water pond with a fringe of green algæ about the sandy border. Under these conditions the birds used their bills as any other sandpipers would, as probes to pick out insects or larvæ from the algæ. Occasionally one would hesitate a moment, when the vascular tip of the mandible quivered slightly as though the bird were straining something out of the green algæ. At this time the bill was held at nearly right angles to the surface of the water; it was never used as a scoop along the surface.

The width of the tip of the bill varies greatly in freshly killed specimens, regardless of sex, as shown at time of capture among the twelve specimens we secured. Of two males at hand, one (Mus. Vert. Zool. no. 16699) has a bill with a width of 11.6 mm., while the other (Willett coll., no. 1698) measures only 9.4 mm. in width.

Comparatively little seems to be known regarding the development and molt of the young of this species. Koren found young able to run about on July 24, 1909, on the mainland near Koliuchin Island. On July 29 at Cape Wankarem he found young "half fledged" and got one of these on the wing at fifty yards. Granville, as previously detailed, saw what he thought were six immature birds of this species in the gray or winter plumage at Wainwright Inlet, Alaska, on August 15, 1914. In spite of the considerable accumulation, during recent years, of data relative to the nesting habits of this peculiar spoon-billed wader, there are many important facts in the life history of this species yet to be ascertained.

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